REMARKS

This amendment is responsive to the office action dated March 25, 2004.

Claims 1-20 were pending in the application. Claims 1-20 were rejected. No Claims were allowed by the Examiner.

Claims 1-20 remain unchanged.

Accordingly, Claims 1-20 are currently pending.

I. INFORMATION DISCLOSURE STATEMENT

The Examiner stated that the IDS filed on 1/6/04 was defective for containing more than 50 references to US patents in a single filing. The Applicant refiled the IDS on 4/7/2004 in two parts, limiting each part to no more than 50 references. Consideration by the Examiner of the newly filed IDS is requested.

II. OBJECTION TO DRAWINGS

The Examiner objected to the drawings because they did not include the reference symbol "H" as stated in the specification. The Applicant has amended this paragraph in the specification by changing the "H" to an "L" thereby conforming the specification to the subject matter as it appears in the drawings. Accordingly, withdrawal of this objection and acceptance of the drawings is requested..

III. REJECTION OF CLAIMS UNDER 35 USC 103

Claims 1-20 were rejected under 35 USC 103(a) as being unpatentable over US Patent No. 5,249,620 (Guerriero). The Examiner has stated that Guerriero teaches all of the aspects of the present invention in ranges that cover the loading limits disclosed in the present invention.

The disclosure in Guerriero however teaches a two-step process where a reinforcing material (typically a metal powder) is mixed with an anti-compaction material.

This material is then placed into a mold cavity and a metal matrix is infiltrated around the mixture. It is clearly disclosed that a porous material is first formed into a distinct structure using the reinforcing powder and the anti-compaction filler before it is placed into the mold (Col. 3, Lines 55-60). There is a coating process first that creates pellets that are placed into a cavity mold and subjected to pressure for sintering. The filler holds the matrix in an uncompacted state to create voids within the structure, reducing the weight of metal material required to form the part. Further, the anti-compaction filler is only disclosed as being a single material coated over the MIM matrix.

This disclosure is in direct contrast to the present invention where a molding compound is formed by mixing a metallic matrix, a first filler and a second filler into a uniform composition that is then subjected to a molding process. In the present invention, a composition is formed where the material is mixed into a homogenous distribution before the net shape molding process and the fillers are selected to reduce thermal interface gaps within the composition. It is clear in Guerriero that the goal is to increase the voids in the initially formed structure to allow the later infiltration of the metallic matrix.

The processes are entirely different and result in entirely different end structures having very different material properties. The Guerriero composition is a process directed to forming a porous metallic structure having microscopic voids throughout wherein the present invention is a process of forming a solid metallic part that is homogenously loaded with filler material that remains in the finished composition and enhances the material properties of the composition.

Because it would not have been obvious to use the teaching in the Guerriero reference to arrive at the present invention, the Applicant requests withdrawal of this rejection.

Claims 1-20 were rejected under 35 USC 103(a) as being unpatentable over US Patent No. 5,249,620 (Guerriero) in view of US Patent No. 5,981,085 (Ninomiya). The Examiner has stated that Guerrierio teaches all of the aspects of the present invention but does not include teaching that discloses a first thermally conductive filler at a percentage of between 25-60%, but that Ninomiya teaches a metal matrix material using

a preform filler in the required ratio and that the present invention would be obvious in view of a combination of these references.

The thrust of the Ninomiya disclosure is directed to forming an object that has enhanced dimensional stability and increased strength to resist ***surface*** peeling. As expected, therefore, the fiber loading is concentrated at the ***surface*** of the composition and this material property is the basis of the entire disclosure. In the context of the Ninomiya disclosure, it is clear that layer 2 does not show anything more than the layed up preform of reinforcing fiber as continually described throughout the disclosure. The fiber is shown in an isolated and concentrated layer near the surface because this is critical to the operation of the overall device. To enhance the thermal expansion properties of the device and limit the overall growth of the part under extreme heat, the fiber ***must*** be concentrated at the surface of the part as shown in layer 2. Further, the fiber cannot be distributed throughout the part in a uniform manner due to the limitations found within the disclosure itself. Since a preform is used, when the part is cavity molded the preform, layed up fiber is maintained in the same relative location within the part as where it was placed in the lay up process.

In contrast, it would be obvious to one skilled in the art that the disclosure provided by the Applicant in the present invention and in particular in Fig 4 of the present application in fact weakens the overall structure and detracts from highly stable part geometries due to the dissimilarities in the adjacent materials throughout the base matrix material. The interfaces between each of the reinforcing fibers are actually reduced if not eliminated, causing voids in the structure of the surrounding matrix and resulting in a weakening of the overall matrix.

Further, regarding Claims 15, 19 and 20, Ninomiya does not teach the use of two filler materials, one of which includes ceramics in any way. While the reference does disclose the possibility of incorporating a ceramic reinforcing filler, it does not describe the selection of a ceramic as one of two fillers that are carefully selected to operate in conjunction. Further, there is no disclosure relative to uniform dispersement of the filler within the matrix. Finally, there is no support in this disclosure describing the use of two different thermally conductive fillers having a different shape and/or a different aspect ratio.

In fact the varied shaped of the filler material in the disclosure of the present invention provides for particular characteristics that can be tailored to the base matrix material being used to further enhance the overall thermal conductivity of the composition. In particular, the various shapes are particularly suited to nest with the crystalline structure of the base matrix material to reduce the interface gaps for improved thermal transfer in the overall composition. This is clearly shown in Fig. 4 of the present application. Therefore, selection of the various shapes of filler is not simply a design choice but an important feature of the invention. As is shown in Fig. 4, the varied filler shapes nest together to reduce interface gaps and enhance the thermal conductivity. There are clearly unexpected results in that the particular shape of the fillers selected and the particular loading ratios cooperate to form a composition wherein the fillers nest within each other to reduce the number of thermal gaps and interfaces within the overall composition as described in the claims.

In reviewing the Ninomiya reference, there simply is no mixing, there is no uniform distribution, there is no enhancement of thermal conductivity throughout the entire part, and there is no reduction in overall thermal interface gaps within the composition. In short, there is no disclosure within Ninomiya that describes any of these aspects of the present invention.

Further, if Ninomiya were combined with Guerriero a a process wherein a porous metal matrix was formed around a preform reinforcing elelemt would be disclosed. It is impossible for the combination of the Ninomiya and Guerriero references to provide sufficient disclosure to enable a person skilled in the art to arrive at the present invention. Since the references cited by the Examiner teache away from the disclosure in the present invention and because the cited references do not either alone or in combination teach the claim limitations of the method of the present invention, the Applicant asserts that it would not have been obvious to a person skilled in the art in view of the cited references to arrive at the present invention.

III. CONCLUSION

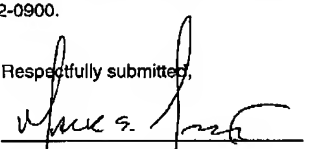
Accordingly, claims 1-20 are believed to be in condition for allowance and the application ready for issue.

Serial No. 10/605,041

Corresponding action is respectfully solicited.

PTO is authorized to charge any additional fees incurred as a result of the filing hereof or credit any overpayment to our account #02-0900.

Respectfully submitted,



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